

THE OZARK GROUP

**Ajax/Gaffney Mine and Mill Sites
(aka Ajax No. 1, Ajax, Ajax Fraction)**

PRELIMINARY ASSESSMENT AND SITE INSPECTION REPORT

Clearwater County
State of Idaho



Department of Environmental Quality

December 2011

Submitted to:
U. S. Environmental Protection Agency
Region 10
1200 Sixth Avenue
Seattle, WA 98101

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STATE OF IDAHO
DEPARTMENT OF
ENVIRONMENTAL QUALITY

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C.L. "Butch" Otter, Governor
Toni Hardesty, Director

December 21, 2011

Mr. Michael J. Gaffney
506 East A Street
Moscow, ID 83843

Subject: Preliminary Assessment and Site Inspection Report for the
Ozark Group (Ajax/Gaffney Mine and Mill Sites)

Dear Mr. Gaffney:

The Idaho Department of Environmental Quality (DEQ) has completed a review of historical mining data and geological information for the above referenced mine, located near Pierce, Idaho. During the site visit, mining activities such as a ventilation raise, waste dump, stamp mill site and shaft were observed and mapped in order to provide a comprehensive analysis necessary to complete a Preliminary Assessment and Site Inspection Report.

Preliminary Assessments are conducted by DEQ according to the Federal Comprehensive Environmental Response, Compensation and Liabilities Act (CERCLA). The reasons to complete a Preliminary Assessment (PA) include:

- 1) To identify those sites which are not CERCLIS caliber because they do not pose a threat to public health or the environment (NRAP);
- 2) To determine if there is a need for removal actions or other programmatic management of sites;
- 3) To determine if a Site Investigation, which is a more detailed site characterization, is needed; and/or
- 4) To gather data to facilitate later evaluation of the release of hazardous substances through the Hazard Ranking System (HRS).

DEQ has also completed PAs under contract with the U.S. Environmental Protection Agency in order to identify risks to human health and the environment, and make recommendations to land owners regarding how risks might be managed, if necessary.

Mr. Michael J. Gaffney

December 21, 2011

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Generally speaking toxicological risks to human and ecological receptors are unlikely at the Ajax/Gaffney Mine and Mill sites. This is due to the lack of residences or structures, site workers, limited public access to the claims, and the sites represent very small percentages of the range for sensitive ecological receptors. There are several well vegetated all-terrain vehicle trails and the waste dump is also very well vegetated. Thus airborne, water, and soil pathways presently do not exist.

The Ajax/Gaffney Mine ventilation raise is open and unrestricted. An old road/ATV trail runs directly next to it. This is a definite and dangerous physical hazard and needs to be closed or have access eliminated.

Elevated arsenic levels in the waste dump presently pose no immediate hazard. Although there are no permanent residents or site workers on or immediately adjacent to the site, some level of risk management planning could reduce or abate risks for these receptors as a result of future developments. As the photographs in Section 8 of the PA report reveal, the whole area is well vegetated and stabilized.

Attached is the Preliminary Assessment and Site Inspection Report. It contains a history of the claims, limited geological information, maps of the property, and the sediment and water metals analysis with an interpretation of the results. This information was used by DEQ to recommend the site be designated as NRAP.

DEQ looks forward to addressing any questions you may have regarding our findings. Please contact me (208-373-0563) if you have any comments, questions, or if I may be of any other assistance. Lastly, thank you for allowing us access to your property.

Sincerely,



Tina Elayer

Mine Waste Program Specialist

Waste Management and Remediation Division

Attachment

cc: Ken Marcy – U.S. Environmental Protection Agency
Ajax/Ozark Mine File

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List of Acronyms

ATV	all-terrain vehicle
BLM	U.S. Bureau of Land Management
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
COC	contaminants of concern
CWA	Clean Water Act
DEQ	Idaho Department of Environmental Quality
EPA	U.S. Environmental Protection Agency
ESU	Ecologically Significant Unit
GIS	Geographic Information System
gpm	gallons per minute
HHSLs	Human Health Medium-Specific Screening Levels
HRS	Hazard Ranking Score
IDTLs	Initial Default Target Levels
IGS	Idaho Geological Survey
MCL	maximum concentration limit
NAIP	National Agriculture Imagery Program
NRAP	No Remedial Action Planned
ORV	off road vehicle
PA	Preliminary Assessment
PPE	probable point of entry
ppm, mg/kg, mg/L	parts per million, milligrams per kilograms, milligrams per Liter
RCRA	Resource Conservation Recovery Act

RMP	Risk Management Plan
SI	Site Inspection
SVL	Silver Valley Laboratories, Inc.
TDL	Target Distance Limit
TMDL	Total Maximum Daily Load
USFS	U.S. Forest Service
USGS	U.S. Geological Survey
VCP	Voluntary Cleanup Program

Section 1. Introduction

This report presents the results of the Preliminary Assessment and Site Inspection (PA/SI) for the Ozark Group of claims. The Ajax/Gaffney Mine and Mill sites are located within the Ozark Group of claims. These claims are in the Pierce Mining District. The Idaho Department of Environmental Quality (DEQ) is contracted by Region 10 of the U.S. Environmental Protection Agency (EPA) to provide technical support for completion of preliminary assessments at various industrial sites on private or state lands and/or those areas that have mixed ownership (public and private).

DEQ also completes site assessments in response to complaints or information about sites possibly contaminated with hazardous waste. These sites include abandoned mines, rural airfields that have served as bases for aerial spraying, old landfills, illegal dumps, and abandoned industrial facilities with known or suspected releases.

In February 2002, DEQ initiated a Preliminary Assessment Program to evaluate and prioritize assessment of such potentially contaminated sites. Due to accessibility and funding considerations, priority is given to sites where potential contamination poses the most substantial threat to human health or the environment. In recent years this priority focuses DEQ's efforts in areas where residential and recreational developments are encroaching on historic mining districts. Priority is also given to mining districts where groups or clusters of sites like those found in the Ozark Group of claims can be cost effectively assessed on a watershed basis.

See the following web page for additional information about DEQ's Preliminary Assessment Program: <http://www.deq.idaho.gov/waste-mgmt-remediation/remediation-activities/mining-preliminary-assessments.aspx>

The Ozark Group of claims is patented claims located on privately held lands (Figure 1). The Ozark Group contains several claims, mines, and a mill site. In June 2011 DEQ visited the area and performed a site assessment. The Ozark Group of claims is contained within the much larger mining area of the Pierce Mining District.

Numerous sources were used during the "desktop" research prior to visiting the site. Most notably are the articles on the history and geology written by S.P. Jellum (1909), A.H. Koschmann and M.H. Bergendahl (1968), F.A. Thomson and S.M. Ballard (1924), and R.E. Bell (1912). DEQ could not improve or expound upon these reports by writing additional historical or geological text, therefore they were directly referenced and cited.

DEQ visited the Ajax/Gaffney Mine and Mill sites on June 29, 2011. DEQ would like to thank the property owner, Mr. Mike Gaffney, and his family for access to the site. DEQ did not purposely or knowingly trespass on any private holdings.

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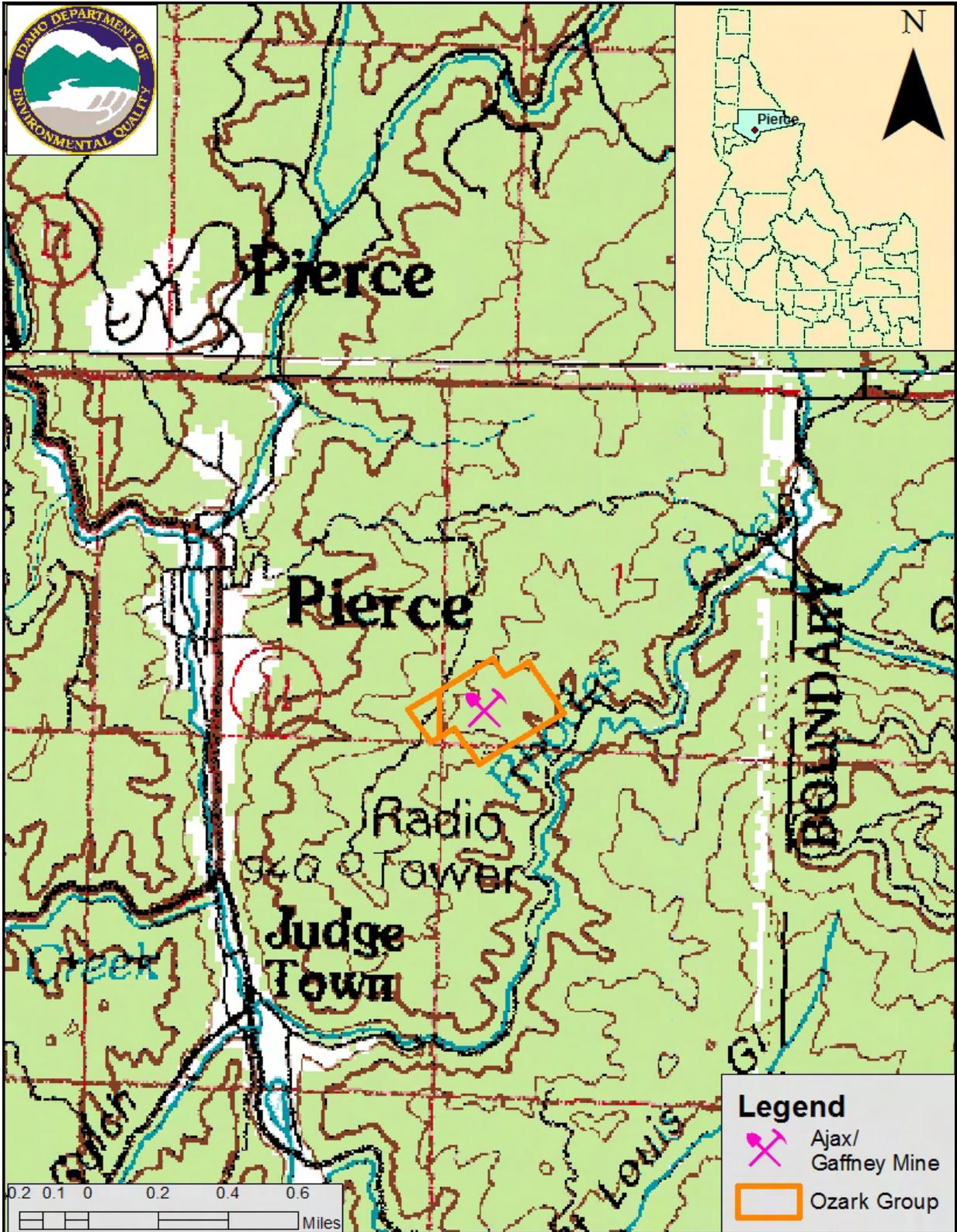


Figure 1. Topographic Overview Map of the Ozark Group of Claims
 (Map Source: USGS 100k Quads)

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Section 2. Ownership

DEQ does not warrant the ownership research or location of property boundaries contained in this report. The information regarding ownership and property boundaries was obtained from the Clearwater County assessor's office and the U.S. Bureau of Land Management (BLM) General Land Office (GLO) records (Figure 2). This area has a mixture of private, private industrial, and State of Idaho ownership.

During the site assessments, DEQ used references from several different documents including U.S. Geological Survey (USGS) maps, county tax rolls, and historical reports that had numerous spellings for claim names, town sites, and/or geographic features. DEQ's use of the different spellings is to remain in context with the reference used for each given section of text or written in this report.

The Ozark Group of claims is owned by Michael J. Gaffney and family. Within the following ownership description the "**Partial Determination**" is meant to convey a very brief summary of DEQ's assessment of individual claims and parcels relative to human health and ecological risk factors associated with toxicological responses to mine wastes. A determination of No Remedial Action Planned or "**NRAP**" means based on current conditions at the site, DEQ did not find any significant evidence that would indicate the potential of adverse toxicological effects to human or ecological receptors on the parcel of land and, therefore no additional work is necessary to manage those potential effects. This determination says nothing about risks associated with physical hazards such as open adits, open shafts, high walls, or unstable ground. Partial Determination of "**Calculate HRS**" indicates DEQ has determined there is sufficient evidence to warrant calculation of a "**Hazard Ranking Score**" (HRS) by EPA's contractors. It also indicates DEQ has made significant conclusions and recommendations that additional site assessment and/or remedial actions are necessary to prevent adverse effects to human or ecological receptors. These conclusions and recommendations are contained in the final section of this report.

<u>Owner</u>	<u>Claim</u>	<u>Parcel Numbers</u>	<u>Partial Determination</u>
Michael J. Gaffney	Ajax No. 1	RP36N05E029900	NRAP
506 East A Street	Ajax	RP36N05E016000	NRAP
Moscow, ID 83843	Ajax Fraction		NRAP

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Figure 2. Aerial photograph overlain by claim boundaries and names of assessed properties in the Ozark Group of claims (names were taken from BLM GLO records).
(Map Source: 2009 Natural Color 1-meter National Agriculture Imagery Program (NAIP) Idaho)

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Section 3. Overview and Location

3.1 Location

The Ozark Group of claims is located at an altitude of 3,253 feet on the hillside northwest of Rhodes Creek which runs southeast of the town of Pierce. The Ajax/Gaffney Mine and Mill sites are located southeast less than a mile from Pierce in Clearwater County, Idaho in Section 2 of Township 36 North, Range 05 East of the Boise Meridian at Latitude 46.48559°N, Longitude - 115.77875°W. They can also be located on the Pierce 7.5-minute topographic map. The Ozark Group of claims is illustrated in Figures 1 and 2.

3.2 Directions to the Mine

Access to the Ozark Group of claims, which are patented claims, was granted to DEQ by Mike Gaffney and his family, the private property owners. The data and observations made during the site visit have been used to come to specific conclusions regarding this private property and to some extent regarding cumulative effects of all public and private mining properties in the watershed.

To access the claims from Pierce, Idaho go approximately one mile south of Pierce through Judge Town and turn east on the Rhodes Creek Road. Travel 1.68 miles along Rhodes Creek to reach the mine which lies to the north (above) the road. Several all-terrain vehicle (ATV) trails and old roads exist on the property.

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Section 4. Mine Site History

DEQ utilizes historical research for several purposes. Initially, historical information highlights potential contaminants of concern, the magnitude of waste sites, and potentially dangerous physical hazards such as open adits and shafts. DEQ also uses the information to properly identify mine and mill facilities, unravel inconsistencies that may exist in property boundaries and ownership, and historical land uses that coincide with mining.

The historical information helps DEQ understand the relative levels of production, commodities, potential waste types, etc. necessary to prepare for site assessment field work. As indicated in the history, the Ozark Group of claims encompassed additional areas besides the Ajax/Gaffney Mine and Mill sites.

DEQ noted during the site visit that many of the mine sites described in the histories are particularly important to both the federal government and State of Idaho. This information documents the relative importance of historic mining districts and workings as they are re-evaluated from the perspectives of economics, multiple land use, human health, and ecological risks.

Numerous sources were used during the “desktop” research prior to visiting the site. Most notably are the articles on the history and geology written by S.P. Jellum (1909), A.H. Koschmann and M.H. Bergendahl (1968), F.A. Thomson and S.M. Ballard (1924), and R.E. Bell (1912). DEQ found very few reasons or basis to expound on these writings.

A.H. Koschmann and M.H. Bergendahl (1968) reported:

Clearwater County was formed in 1911 from parts of Nez Perce, Shoshone, and Idaho Counties, and had a total gold production through 1942 of about 29,136 ounces; and from 1943 through 1959, mines in the county produced 1,001 ounces. Most of the gold credited to Clearwater County came from the Pierce district in T. 36 and 37 N., R. 4 and 5 E. However, most of the gold mining in this district occurred before Clearwater County was in existence; hence, the early production is included with other counties.

In the fall of 1860, E. D. Pierce led a party of 12 miners into the upper Clearwater River region, a territory which was guarded by the Nez Perce Indians. Within a short time, substantial amounts of gold were found in the gravels of Orofino Creek, a tributary of the Clearwater River. Before the end of the year, the town of Pierce was founded, and enough gold was mined to attract a horde of prospectors despite forceful Indian objections. The placers of this district were the first in Idaho to be worked on a large scale, and their development accelerated interest in gold prospecting throughout the State. Unlike many other districts that collapsed completely after the initial boom, the Pierce District continued to be active, though after 1875 the pace was slower. Ross estimated a total production of between \$5 and \$10 million in gold before 1875. Lindgren reported the production before 1902 in this manner: "A guess may be hazarded that the

total output of Pierce is in the vicinity of \$5 million." According to S. M. Barton, M. W. Wells, and E. Oberbillig, the most productive period was between 1861 and 1867, when gold with an estimated value of \$3,400,000 was produced.

A noticeable decline in production began in 1866 because lower grade deposits were being mined by Chinese labor employed at low wages. In later years the district was rejuvenated periodically by large-scale dredging operations. Sometime before 1905 lode mines were developed and yielded about \$250,000 in gold. The most important of these was the Wild Rose mine.

The placers were worked on a moderate scale through the 1930's, but after 1941 they produced only a negligible amount. Total production of the district through 1959 was about 385,000 ounces.

S.P. Jellum (1909) reported:

Ozark M. & M. Co. The holdings of the Ozark M. & M. Co. comprise the Ozark, Wild Rose and Cameron groups of claims, together with two long ditches, water rights and mill sites. The Ozark group is situated about one mile southeast of Pierce City and consists of six full claims and a fraction. (Three are identified on Figure 2 according to BLM GLO records).

There are three veins on the group, but principal work has been done on the middle vein, which has over 2000 feet of development, principally as long shallow drifts on the main vein and a cross vein. The formation is granite and the main vein has a strike of N. 76 degrees E., with a variable dip to the south. The width of vein varies from 1 1/2 to 11 feet, and the filling consists of banded quartz and crushed and broken granite, usually between well-defined walls. The ore shoots are not long, but occur close together and will probably form one long shoot at a little more depth.

Mint receipts show a production of about \$20,000 on this property during the time that is was operated by the former owners. The ore exposed in the present workings has an average value of about \$14 per ton; with occasional bunches that run much higher. The cross vein intersects the main vein at a sharp angle and for a distance of 150 feet north of the intersection forms a large shoot of high grade sulphide ore and is richest at the intersection.

A shoot of free milling ore of good grade has been opened up on the north vein by a short crosscut and drift. This vein has a strike of N. 56 degrees E. and intersects the other veins. Geo. S. Bailey, Pierce City, Idaho, is president, and J. H. Jones, Lewiston, Idaho, is secretary.

Robert E. Bell (1912) reported:

The principal feature of mining interests in this county is at the old placer district of Pierce City, where small hydraulic and sluicing operations are still continued and produce considerable gold. In addition to these, the most important operation in this district is that of a small dredge a short distance above Pierce City that is doing excellent work and is said to be recovering over 25 cents per yard of the gravel handled. It is also situated on excellent ground that carries good values, as tested by actual working tests and drilling and estimated to average 30 cents per cubic yard, but this dredge was poorly designed and is equipped with a very expensively operated steam power plant that increased the cost of operation to a point that leaves hardly any profit.

There is now electric power available in this district and a few thousand dollars would change the power design of this plant and greatly reduce the cost of its operation and permit a handsome margin of profit.

A movement was recently on foot for the purpose of taking over this property from its present owners and reconstructing the power plant, and if this transaction is successfully consummated it will doubtless result in doubling the present dredging gold output of the Pierce District.

Francis A. Thomson and Samuel M. Ballard (1924) reported:

The Ozark group of claims is located on three roughly parallel quartz veins which strike N. 30°-45° E., and are approximately 500 feet apart. The middle or Ozark vein is developed by 2000 feet of shallow drifts, tunnels and shafts, and about 1000 tons of \$10 to \$20 ore has been milled from these workings according to Mr. John Gaffney. This development is interesting, because it is the one known example of a vein intersection, showing pay ore on each vein at the crossing. The cross or No. 2 vein. strikes N. 35°W., and dips 60°-75° SW, but the dip of the Ozark veins is 75°-85° S. E. The ore below the water level is said to be highly arsenical, making treatment by amalgamation no longer possible.

Nicholas T. Zilka, David A. Benjamin, J. Douglas Causey, and Leon E. Esparza (1987) reported:

The Pierce district is on the western edge of, and mostly outside, the study area and includes the headwaters of Orofino Creek. Most of the production from the district has come from gold-bearing placers. Altogether, Orofino Creek was worked for 12 miles above Pierce, especially along Rhodes and Canal Gulches, and 10 mi below, most of the deposits have been mined out. Principal lode mines are the Wild Rose, Bond, and Red Cloud; none are known to have been active since the 1940's.

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Section 5. Climatology

As reported in the Lower North Fork Clearwater River Subbasin Assessment and TMDL (DEQ 2002):

Northern Idaho is dominated by Pacific maritime air masses and prevailing westerly winds. Over 85 percent of the annual precipitation occurs during the fall, winter, and spring months. Cyclonic storms consisting of a series of frontal systems moving east produce long duration, low intensity precipitation during this period of the year. In winter and spring, this inland maritime regime is characterized by prolonged gentle rains, fog, cloudiness, and high humidity; with deep snow accumulations at higher elevations. Winter temperatures are often 15° to 25°F warmer than the continental locations of the same latitude. The climate during the summer months is influenced by stationary high pressure systems over the northwest coast. This warm dry system results in only 10-15 percent of the annual precipitation falling during the summer.

The nearest climatic data is from the town of Headquarters which is approximately 10 miles north of Pierce and at a similar elevation of approximately 3,200 feet. The mean annual temperature is 43.3°F with the mean annual precipitation being 40.1 inches. The number of days with temperatures greater than 90°F per year is 13.4.

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Section 6. General Geology

S.P. Jellum (1909) reported the following:

Lode deposits are discontinuous fissure fillings of quartz, auriferous pyrite, free gold, and some arsenopyrite. They are distributed in or near gneissic bodies and are closely associated with pegmatite, aplite, and diabase dikes.

A.H. Koschmann and M.H. Bergendahl (1968) reported:

The Pierce district is underlain by granitic rocks of the Idaho batholith, Precambrian metasedimentary rocks of the Belt Series, and Columbia River Basalt. The lode deposits are discontinuous fissure fillings of quartz, auriferous pyrite, free gold, and some arsenopyrite. They are distributed in or near gneissic bodies and are closely associated with pegmatite, aplite, and diabase dikes. The placers are in stream channels and on terraces as much as 500 feet above present streams.

Terrace deposits possibly were formed along stream channels dammed by the Columbia River Basalt and were left in their present perched positions by subsequent erosion of later diverted drainage systems. Perched or bench placer deposits are characteristic of much of the area in central Idaho.

An unknown author reported the following:

The country rock, east of the basalt contact, is similar to that of the other areas discussed. French Mountain, which rises to an altitude of about 5000 feet, lies about 4 miles northeast of Pierce City. Apparently this represents a "cupola" or high point in the granite batholith as do Buffalo Hump, Pilot Knob, Anderson Butte, and other eminences in the vicinity of the gold veins on the south side of the Clearwater. This cupola is naturally flanked on all sides by the gneissoidal shell and the older metamorphics, gneiss, schist, and quartzite.

Dikes, pegmatitic, aplitic, and diabasic are everywhere in evidence wherever the gold quartz veins of the area have been developed. At one point in the Wild Rose Mine, to be later discussed, there occurs a typical pegmatite dike, consisting of unusually regular and uniformly sized crystals of pink orthoclase, white quartz, and muscovite, each from one-half to three-fourths inch in diameter. This dike is intersected by a tunnel at a point 150 feet below the surface and at this depth assays consistently from \$2 to \$4 in gold. The quartz veins, as elsewhere, are found best developed in the mica schists and show some tendency to attenuation and impoverishment where they occur in the granite itself.

The greatest development of the quartz veins has been confined to a relatively small area to the eastward of Pierce City on Rhodes Creek and its tributaries.

Figure 3 is a map of the major lithology in the vicinity of the Ozark Group of claims.

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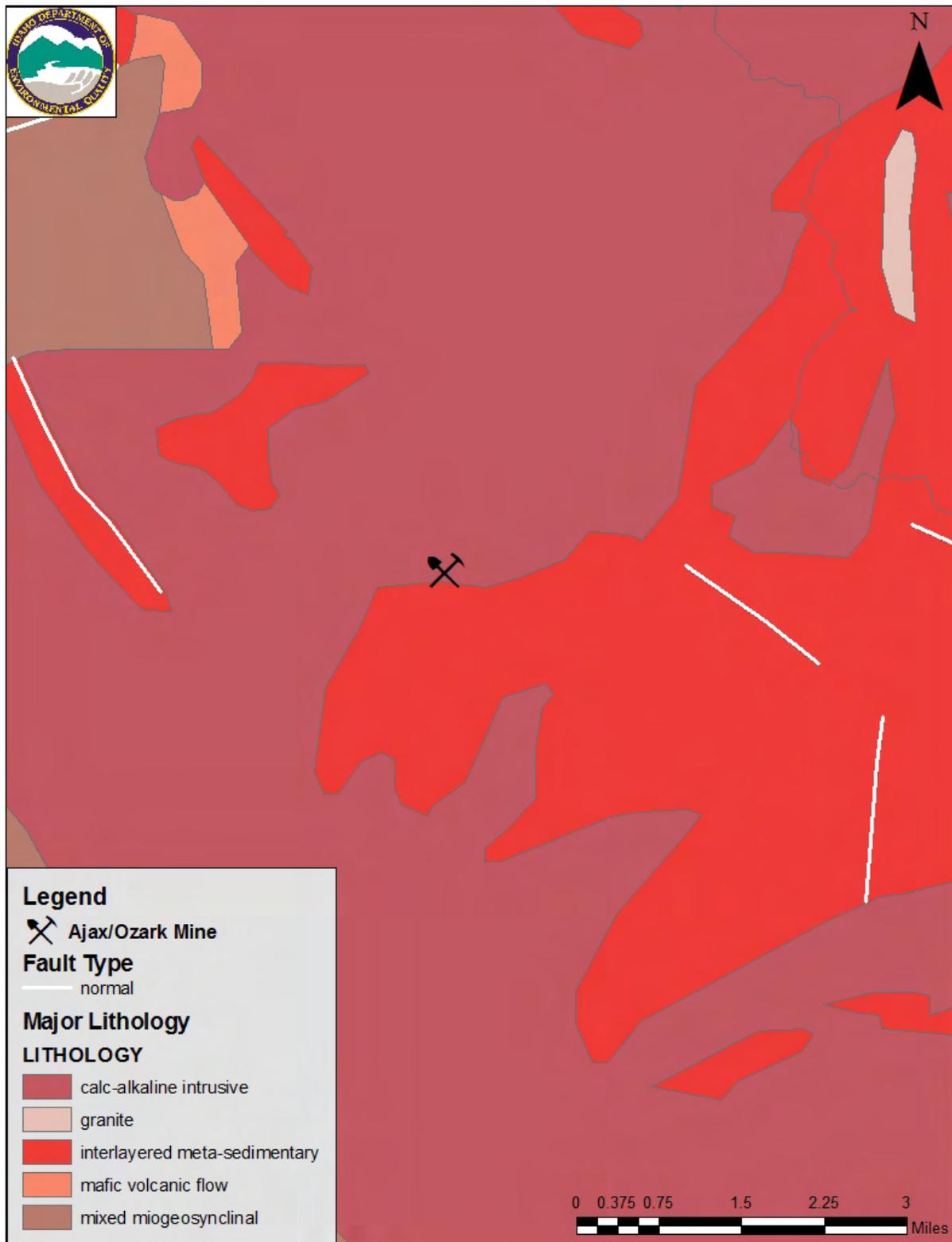


Figure 3. Map of Major Lithology in the Vicinity of the Ozark Group of Claims

(Map Source: ArcSDE.deqgis83.DBO.major lithology)

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Section 7. Current and Potential Future Land Uses

More than 100 years ago the beneficial use of lands and waters in the Pierce Mining District was mining, subsistence hunting and fishing and associated commerce to support the mining operation industry. These uses expanded to include a broader market for timber, fur trapping, recreational hunting and fishing, camping, off road vehicle (ORV) touring. Very little evidence of livestock, specifically the cattle industry, was found at the site. It is possible that eventually the patented claims will be subdivided and sold for recreational properties. At the time of this writing no cabins, homes or structures have been constructed on the claims. A few old roads/trails exist on the claim and a limited amount of ATV use is apparent, probably primarily for hunting.

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Section 8. Mine Site Conditions

The Ajax/Gaffney Mine and Mill sites are located on both the east and west flanks of the ridge above the town of Pierce (approximately one mile). The west side of the ridge is dominated by clear cut timber units on lands administered by the State of Idaho and the U.S. Forest Service (USFS). There are no residents or recreational dwellings anywhere on the site. All of the photographs in this section were taken by DEQ on June 29, 2011.

There are no waste issues at the mill site. Nothing but foundations at the old mill site remains. There were no apparent residual tailings and, although a tributary to Rhodes Creek flows approximately 50 feet below the structures, there are no apparent deliveries of contaminants to the stream.



**Photo 1. Footings/foundations of the stamp mill are overgrown with vegetation.
Latitude 46.48465°N, Longitude -115.77894°W**

The mill footings and stamp mill were apparently constructed in the early 1900's and operated until the stock market 1928 crash. There may have been some sporadic operations after World War II into the 1950's.



Photo 2. Ajax/Gaffney Mill Foundation

The Ajax Shaft was closed in late 1970's. However the shaft collar still has a distinct rectangular shape consistent with the remains of a two-compartment shaft. Ventilation tubing was found coming out of the opening validating this conclusion. No remnants of a head frame were found.



Photo 3. Ajax/Gaffney Caved Shaft No. 1
Latitude 46.48539°N, Longitude -115.78063°W

The shaft's waste dump is irregularly shaped with at least two separate lobes. It appears less than 5,000 cubic yards in size and consists largely of granitic country rocks. The dump is very well vegetated with no plant stress apparent.



Photo 4. Waste dump for the Ajax/Gaffney Shaft is lushly vegetated.

The Ajax/Gaffney Mine ventilation raise is open and dangerously unrestricted (Latitude 46.48621°N, Longitude -115.78155°W). DEQ recommends the shaft should be closed.



**Photo 5. The Ajax/Gaffney Mine ventilation raise is open and dangerously unrestricted.
Latitude 46.48621°N, Longitude -115.78155°W**

Although there are no obvious discharges from the Ajax/Gaffney Mine and Mill sites, a surface water sample was taken from a small creek tributary flowing through the property into Rhodes Creek. Surface water sample AJSW1 was taken uphill of the road but downhill of the mining activity at Latitude 46.48402°N, Longitude -115.77785°W.



Photo 6. Wetlands dominate Rhodes Creek below the Ajax/Gaffney Mine.

Section 9. Sample Collection and Analysis

9.1 Collection

Two samples were collected from the Ajax/Gaffney Mine property. Soil sample AJWDSS1 was collected from a waste dump and surface water sample AJSW1 was collected below the property. However, it did not appear as though significant sulfides or contaminants of concern (COCs) were present, so no background soil or water samples were collected.

- Soil (Sample AJWDSS1) – Latitude 46.48402°N, Longitude -115.77785°W
- Water (Sample AJSW1) – Latitude 46.48499°N, Longitude -115.77988°W

The waste dump soil sample AJWDSS1 was sieved at the sample location, placed in a properly marked zip lock bag and then placed in a similarly marked cloth bag, and entered into the Chain-of-Custody form prior to shipping to Silver Valley Laboratories, Inc. (SVL). The portion of the sample that passed through a 9 mesh sieve was sent for laboratory analysis.

After the sample was bagged and tagged, Nitrile gloves and disposable plastic spoons were discarded into a sealable waste bag. The screens used to sieve and collect samples were washed and scrubbed with Alconox and thoroughly rinsed with distilled water and then dried with paper towels. The sieves were then stored in a clean, isolated container for transportation to the next sample location.

Prior to collection of field parameters for water quality analysis, laboratory prepared sample bottles were labeled and triple rinsed by a gloved technician who then filled the bottles as grab samples. The bottles were acidified with 10 ml nitric acid, closed, dried, and placed in a cooler with ice.

Once the surface water sample AJSW1 was collected, a technician used a Horiba to collect field parameters (pH, conductivity, dissolved oxygen, and temperature) from an undisturbed site slightly up gradient from where the water sample was collected. Subsequent to collection of field parameters, the probe for the Horiba was rinsed in distilled water and recalibrated for each new site.

The surface water sample was submitted in accordance with EPA Chain-of-Custody procedures to SVL in Kellogg, Idaho for analysis of RCRA 8 Suite (arsenic, barium, cadmium, chromium, lead, mercury, selenium, silver) plus copper, iron, manganese, antimony, and zinc. A copy of the laboratory report is included as Appendix A. A summary of the laboratory results is included in the tables in Sections 9.2 and 9.3. Figure 4 shows the sample locations.

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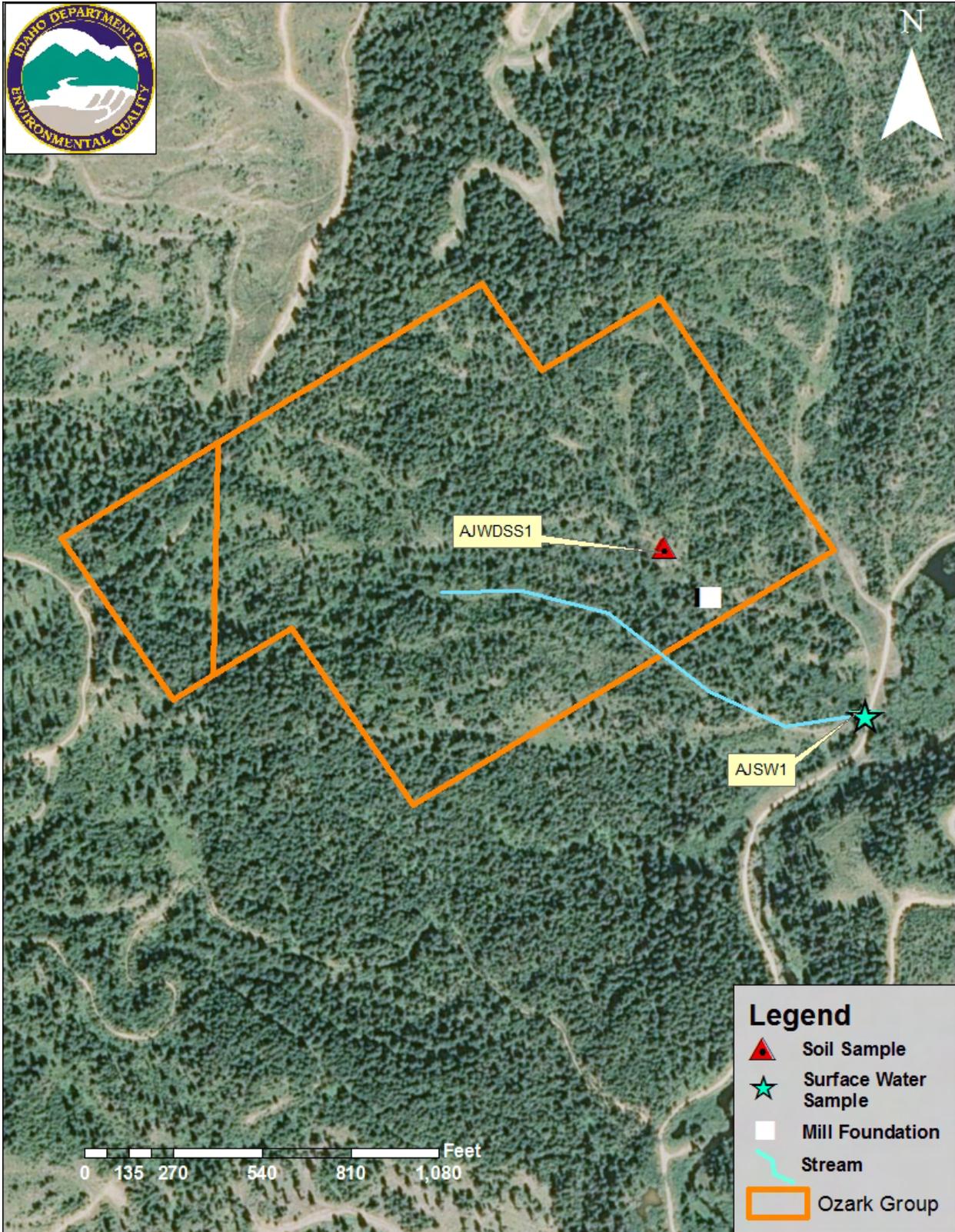


Figure 4. Sample Locations and Features in the Ozark Group of Claims
 (Map Source: 2009 Natural Color 1-meter NAIP Idaho)

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9.2 Soils Analysis

The waste dump soil sample was analyzed at SVL utilizing EPA 6000/7000 method 6010B for all metals except mercury where method 7471A was utilized. Laboratory analytical results have been compared to and will be discussed below relative to Idaho’s *Initial Default Target Levels* (IDTLs), EPA Region 6 Human Health Screening Levels (HHSLs), and the BLM Wildlife and Livestock Risk Management Criteria for Metals in Soils (Technical Note 390 Rev. 2004).

The IDTLs are risk-based target levels for certain chemicals that have been developed by DEQ using conservative input parameters, a target acceptable risk of 10^{-5} , and a *Hazard Quotient* of 1. These numbers, although used for comparison even at remote locations, are more applicable to sites where “unrestricted uses” such as residential development are expected. Similarly, the EPA Region 6 HHSLs are human health based risk derived for screening where residents are at risk for exposure.

Table 1 summarizes laboratory analytical results for the soil sample collected. Waste dump soil sample AJWDSS1 exceeded the IDTLs for arsenic by 1,299 times, for chromium by 5.3 times, for manganese by 2.8 times, for selenium by 2.6 times, for silver by 6.3 times, and for mercury by 66 times. This sample exceeded the HHSLs for arsenic by 22 times.

Table 1. Ajax/Gaffney Mine Site Waste Dump Soil Sample Analysis

Metals	IDTLs (mg/kg)	HHSLs (mg/kg)	Ajax/Gaffney Mine Waste Dump Sample AJWDSS1 (mg/kg)
Antimony	4.77	31	<2.0
Arsenic	0.391	23	508
Barium	896	1600	416
Cadmium	1.35	39	1.35
Chromium	7.9	210	41.9
Copper	921	2,900	123
Iron		55,000	40,800
Lead	49.6		12.4
Manganese	223	3600	637
Selenium	2.03	23	5.4
Silver	0.189	390	1.2
Zinc	886	390	82.3
Mercury	0.00509	23	0.338

Orange = Exceeds Idaho Initial Default Target Levels (IDTLs).

Yellow = Exceeds Human Health Screening Levels (HHSLs).

Pink = Exceeds both IDTLs and HHSLs.

These concentrations, with the exception of arsenic, are not unusual for a location or facility in a historic mining area such as the Ozark Group of claims. The arsenic concentrations are elevated, but as explained above for the IDTLs and HHSLs, these target or screening levels were developed for areas where residents are at risk of exposure. Provided future beneficial uses do not disturb the waste piles, or involve residential development then human health risks are diminished. However, if future uses involve disturbing the waste dumps and/or residential development, then risk management plans should be developed and implemented.

Waste dump soil sample AJWDSS1 exceeded the BLM risk factors (Table 2) for arsenic in elk by 1.5 times, mule deer by 2.5 times, deer mice by 2.2 times, cottontail rabbits by 1.1 times, Canada goose by 8.3 times, mallard by 4.3 times, robin by 127 times, cattle by 1.2 times, and sheep by 1.8 times. The sample exceeded the level for cadmium in the mallard by 1 time and the robin by 4.5 times. The sample exceeded the level for copper in mule deer by 1.2 times. The sample exceeded the level for lead in the robin by 2 times. The sample exceeded the level for zinc in the robin by 1.9 times.

Table 2. Wildlife and Livestock Risk Management Criteria for Metals in Soils (mg/kg)
BLM Technical Note 390 Rev. 2004 “Risk Management Criteria for Metals at BLM Mining Sites”

Metals	Elk	Mule Deer	Deer Mine	Cottontail Rabbits	Canada Goose	Mallard	Robin	Cattle	Sheep	Median Values	AJWDSS1
Antimony											<2.0
Arsenic	328	200	230	438	61	116	4	419	275	275	508
Barium											416
Cadmium	3	3	7	6	2	1	0.3	15	12	8	1.35
Chromium											41.9
Copper	131	102	640	358	161	141	7	413	136	136	123
Iron											40,800
Lead	127	106	142	172	34	59	6	244	125	125	12.4
Manganese											637
Selenium											5.4
Silver											1.2
Zinc	275	222	419	373	271	196	43	1,082	545	307	82.3
Mercury	11	11	2	15	6	4	1	45	8	8	0.338

Bold = Metals concentrations exceeded the BLM Risk Management Criteria.

The value for arsenic relative to the robin is 127 times. Although the value is high, it is unlikely a robin exposure would occur due to the heavy vegetation and duff covering the waste pile. Given the relatively small percentage the exposed waste dumps have for sensitive ecological receptors, it is likely ecological risks are insignificant at the mine waste dump. Nevertheless, the property owner needs to be aware of the elevated arsenic levels for future consideration.

9.3 Water Quality Sample Analysis

There is significant interaction between surface water and ground water systems, with the latter being more influent on the former. Although metals are present locally, field parameters and laboratory analyses indicate buffering capacity in host rock in the water column stifles migration of metals through the local surface water and ground water systems.

Surface water sample AJSW1 was collected from a tributary to Rhodes Creek which runs through the mining claims. The sample was collected downstream/down slope from the mine.

This water sample did not exceed the DEQ drinking water standard, and it did not exceed the DEQ cold water biota standard. This sample did not exceed State of Idaho standards for temperature, dissolved oxygen, pH, and turbidity.

The values shown in Table 3 are not remarkable and it is unlikely any human health risks or ecological health risks are associated with this area.

Table 3. Total Recoverable Metals Analysis in Surface Water – Ajax/Gaffney Mine Site (Concentrations expressed in mg/l unless otherwise stated.)

Description	DEQ Ground Water Standard (T)	DEQ Drinking Water Standard MCL	DEQ Cold Water Biota Standard Acute	DEQ Cold Water Biota Standard Chronic	Surface Water Sample AJSW1
Antimony					<0.020
Arsenic	0.05	0.01	0.36	0.19	<0.025
Barium	2	2			0.0761
Cadmium	0.005	0.005	0.00082 (H)	0.00037 (H)	<0.0020
Chromium (Total)	0.1	0.1			<0.0060
Copper	1.3		0.0046 (H)	0.0035 (H)	<0.01
Iron	0.3*				0.221
Lead	0.015	0.15	0.014 (H)	0.00054 (H)	<0.0075
Manganese	0.05				0.011
Selenium	0.05	0.05	0.018 (T)	0.005 (T)	<0.040
Silver	0.1*		0.0032 (H)		<0.0050
Zinc	5*		0.035 (H)	0.032 (H)	<.01
Mercury	0.002				
pH	6.5 – 8.5 su			6.5 – 9.0 su	7.23 su
Conductivity					0.298 µs/cm
Turbidity				Not >50 NTU instantaneous and not >25 NTU over a 10 day period	n/a
Dissolved Oxygen				<6	11.08
Temperature				Cold water aquatic life 22°C or less or a maximum daily average not >19°C Salmonid spawning 13°C or less with a maximum daily average not >9°C	9.5°C
Salinity					0%

*Secondary MCL (T) – Standard in Total (H) – Hardness dependent *23mg/l

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Section 10. Pathways and Environmental Hazards

10.1 Ground Water Pathways

In areas where historic mines are located in proximity to residential areas, contamination of drinking water systems may come from two types of mine sources (ore bodies and waste dumps) and along three pathways, as illustrated by the following three scenarios. First, heavy metals leach from tailings piles and waste rock dumps, enter ephemeral or perennial drains, and then contaminate the area's shallow ground water system. Second, heavy metals leach from the local ore bodies and are transported through the geologic structure to the shallow ground water. Third, heavy metals could leach out of the ore bodies, and be discharged from the underground workings as adit water, that is then conveyed through ephemeral and perennial drains to the shallow ground water systems.

10.2 Surface Water Pathways

The surface water migration pathway target distance limit (TDL) begins at the probable point of entry (PPE) of surface water runoff from a site to a surface water body and extends downstream for 15 miles. A map showing the source water delineation including the 15-mile surface water TDL for the Ozark Group of claims is presented in Figure 5.

The PPE starts just upstream of Rhodes Creek at sampling site AJSW1. Rhodes Creek is a tributary of Orofino Creek. The town of Pierce is located within the 15 mile TDL downstream of the PPE.

10.3 Domestic Wells and Public Water Supplies

There are 10 domestic wells and five public water system wells located within the four mile radius of the Ozark Group of claims (Figure 5). No wells exist on the claims group. However, the entire group of claims is located in the source water delineation zone with a time of travel of three years.

10.4 Air Quality Pathways

The air quality pathways are not complete. No residences exist on the claims. All waste piles are located well off the trails and are well vegetated and stable. The few trails/roads at the site are well vegetated with limited use evident.

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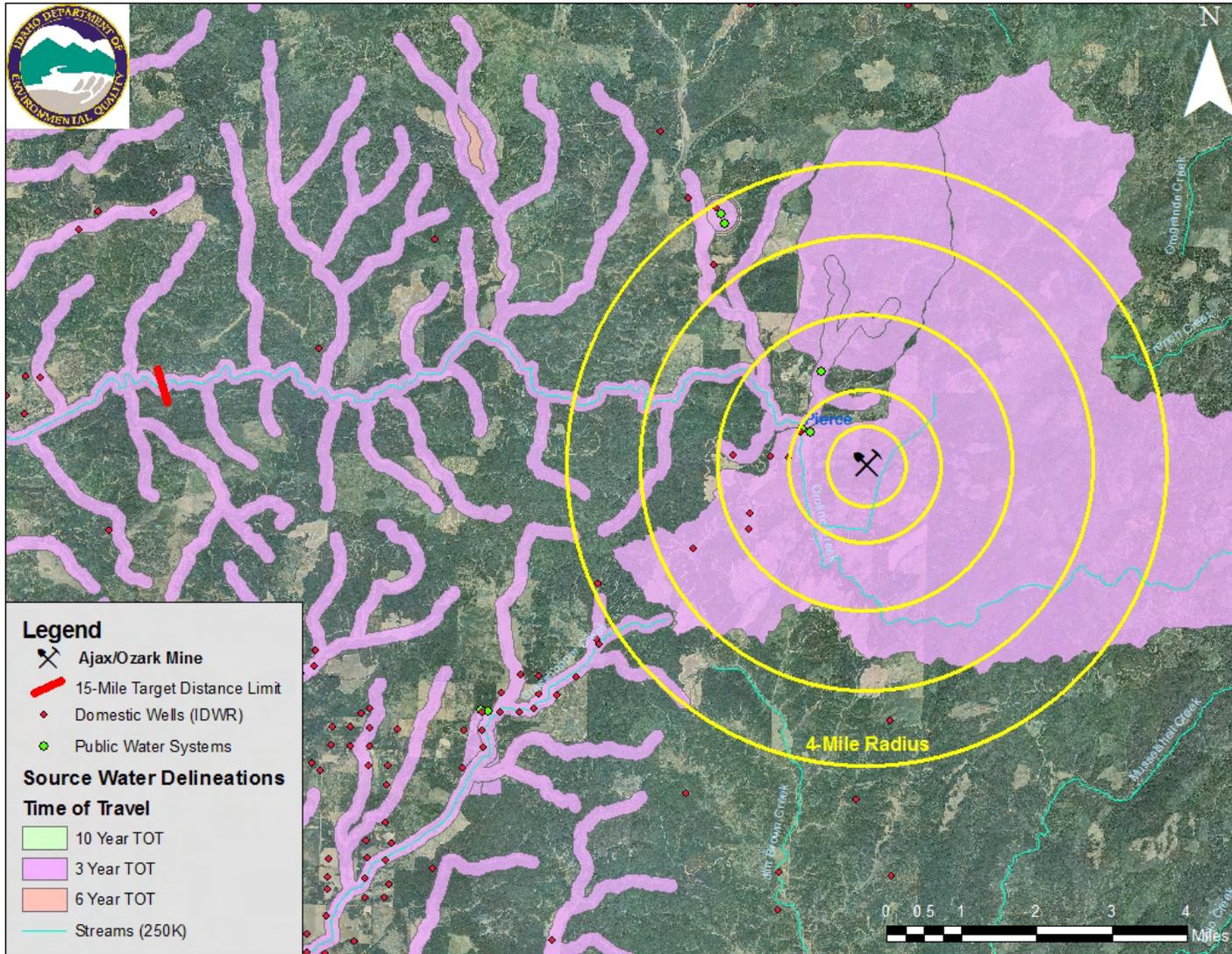


Figure 5. Domestic wells and public water system wells located within the 4-mile radius ring, 15-mile TDL of the Ozark Group of claims. There are no significant wetlands recognized by the U.S. Fish and Wildlife Service in the vicinity.
 (Map Source: 2009 Natural Color 1-meter NAIP Idaho)

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10.5 Soil Exposures

The soil exposure pathways are not complete. No permanent residents presently reside on the Ajax/Gaffney Mine and Mill sites or the Ozark Group of claims, nor are there any site workers. All historic mine and mill site related disturbances are well vegetated and stable. Access to the mine is limited with occasional use by hunters and incidental visits by others, thus soil pathways are sporadic at best and incomplete for these users.

10.6 Residences, Schools, and Day Care Facilities

The nearest potential permanent residents are approximately two miles down gradient and downstream of Rhodes Creek. There are an elementary and a middle school in Pierce. There are no day cares in Pierce.

10.7 Wetlands

Although no significant wetlands have been officially delineated in the area, there are considerable wetlands and riparian areas observed within the two mile radius of the Ozark Group of claims. Nevertheless, DEQ did not find any indications that significant releases have occurred from the mine and mill sites, nor was there delivery to these wetlands.

10.8 Sensitive, Rare, and Threatened Species (Plant and Animal)

Most of the sensitive species have huge ranges which overlap onto the Ozark Group of claims. Due to the size of those ranges, these species may not receive significant exposure time or doses to heavy metals. Sediment and soil pathways do not appear to be complete at or adjacent to the Ajax/Gaffney Mine and Mill sites inspected. It is possible one or all of these plant species could grow on soils with elevated metals. No indication or evidence of stressed plants was encountered at the time of the site visit.

Two rare or sensitive plant species are documented to exist within the 4-mile radius of the Ozark Group of claims (Figure 6). The following plants are listed as no status.

Rare or sensitive plants include:

Case's Corydalis (*Corydalis caseana ssp. hastata*)

Bristle-stalked Sedge (*Carex leptalea*)

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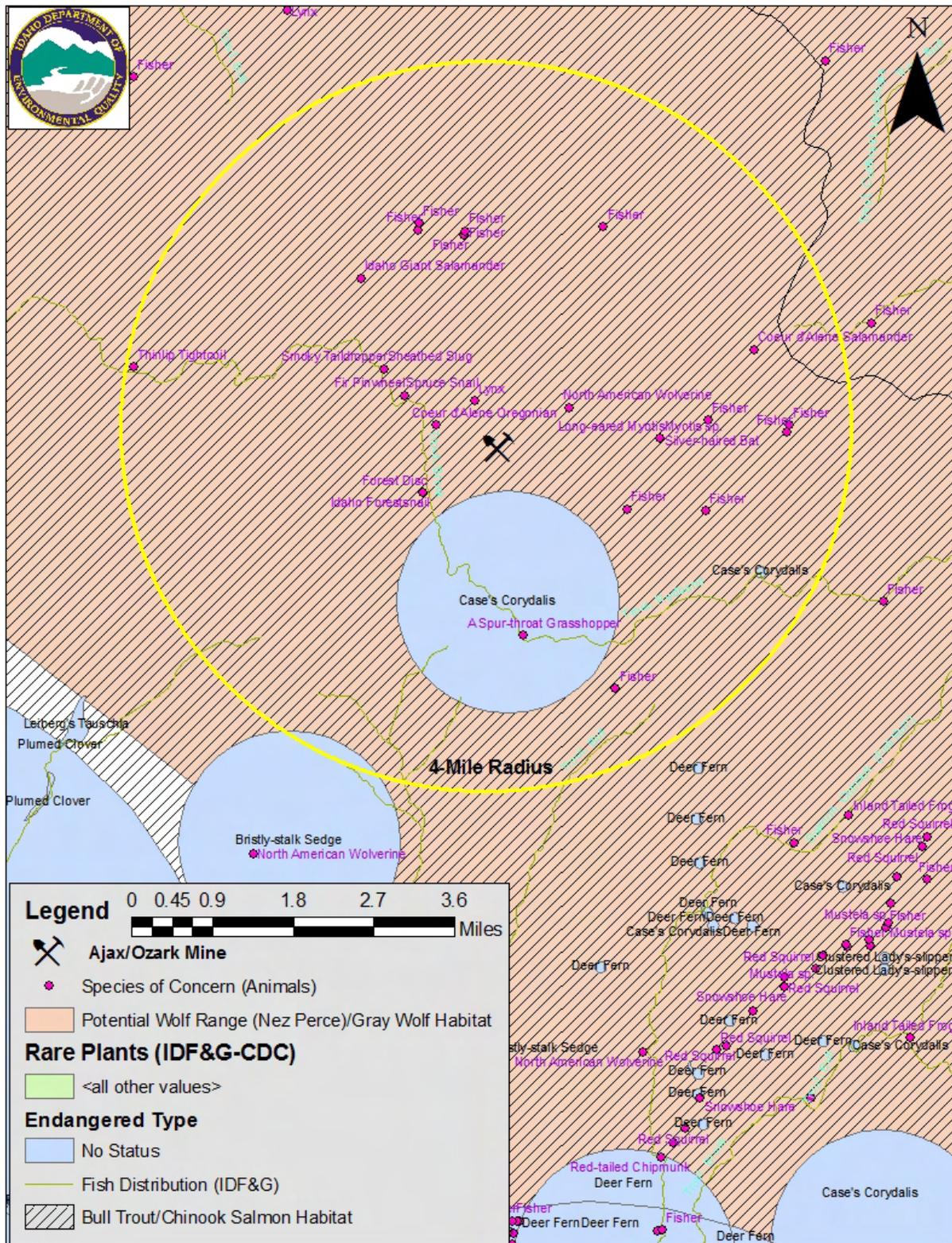


Figure 6. Sensitive Species In and Around the Ozark Group of Claims; Species of Concern (Plants)
 (Map Sources: SDE Feature Dataset, Animal Conservation Database; Idaho DEQ GIS ArcSDE 9.2 Geodatabase)

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Below is a list of non-game and game animals listed within the 4-mile radius of the Ozark Group of claims. The non-game animals are listed as “species of concern” and have no status. The game animals are regulated by the Idaho Fish and Game. However, due to the lack of tailings impoundments, well vegetated dumps, and unremarkable water chemistry results, it is unlikely there is a significant source for exposure (Figure 6).

Animal Species of Concern include:

Fisher (*Martes pennant*)
Idaho Giant Salamander (*Dicomptodon aterrimus*)
Sheathed Slug (*Zacoleus idahoensis*)
Smoky Taildropper (*Prophysaon humile*)
Lynx (*Lynx canadensis*)
Fir Pinwheel (*Radiodiscus abietum*)
Banded Tigersnail (*Anguispira kochi*)
Robust Lancetooth (*Haplotrema vancouverense*)
Forest Disc (*Discus whitneyi*)
Idaho Forest Snail (*Allogona ptychophora*)
Coeur d'Alene Oregonian (*Cryptomastix mullani*)
North American Wolverine (*Gulo gulo luscus*)
Myotis sp. (*Myotis*)
Long-eared Myotis (*Myotis evotis*)
Silver-haired Bat (*Lasionycteris noctivagans*)
Coeur d'Alene Salamander (*Plethodon idahoensis*)
Spur-throat Grasshopper (*Melanoplus digitifer*)
Gray Wolf (*Canis lupus*)
Potential Wolf Range (Nez Perce)

10.9 Fisheries

The following fish species have been observed by Idaho Fish and Game within the four mile radius of the Ajax/Gaffney Mine. The Chinook salmon are in an Ecologically Significant Unit (ESU) (fall and spring-summer runs).

In general the area is classified as “critical habitat” for all of the species, with the exception of brook trout, and is classified as “known occupied for the bull trout.” Results of the water chemistry analysis for the mining district indicate no threat to these fish from mine related discharges.

Westslope Cutthroat Trout (*Oncorhynchus clarki lewisi*)
Sockeye Salmon (Snake River Runs) (*Oncorhynchus nerka*)
Chinook Salmon (*Oncorhynchus tshawytscha*) (Fall/Spring/Summer runs)

Bull Trout (*Salvelinus confluentus*)
Steelhead (*Oncorhynchus mykiss*)
Redband Trout (*Oncorhynchus mykiss*)
Brook Trout (*Salvelinus fontinalis*)

10.10 Sensitive Waterways

Orofino and Rhodes Creeks, Waterbody ID17060306CL039_03, are listed on the State of Idaho 303(d) list for impaired waters. They are listed as not supporting salmonid spawning due to temperature. The Clean Water Act (CWA) requires the state to prepare a report, listing (a) the current conditions of all state waters and (b) those waters that are impaired and needing a TMDL (total maximum daily load). The first list is called the 305(b) list and the second is called the 303(d) list. Both lists are named in accordance with the sections of the CWA where they are defined; together they are known as the Integrated Report. Although they are maintained as separate lists and presented separately in the Integrated Report, impaired waters are just some of the state's waters, so water on the 303(d) list is actually a subset of those on the 305(b) list. Figure 7 illustrates the relationship between 303(d) and 305(b) lists.

10.11 Livestock Receptors

There is no grazing allotment in the area. No evidence of livestock being pastured on a long term basis was noted at the Ajax/Gaffney Mine and Mill sites. Therefore, pathways or exposures for livestock are minimal including those pathways to horses used by packers for hunting and recreation.

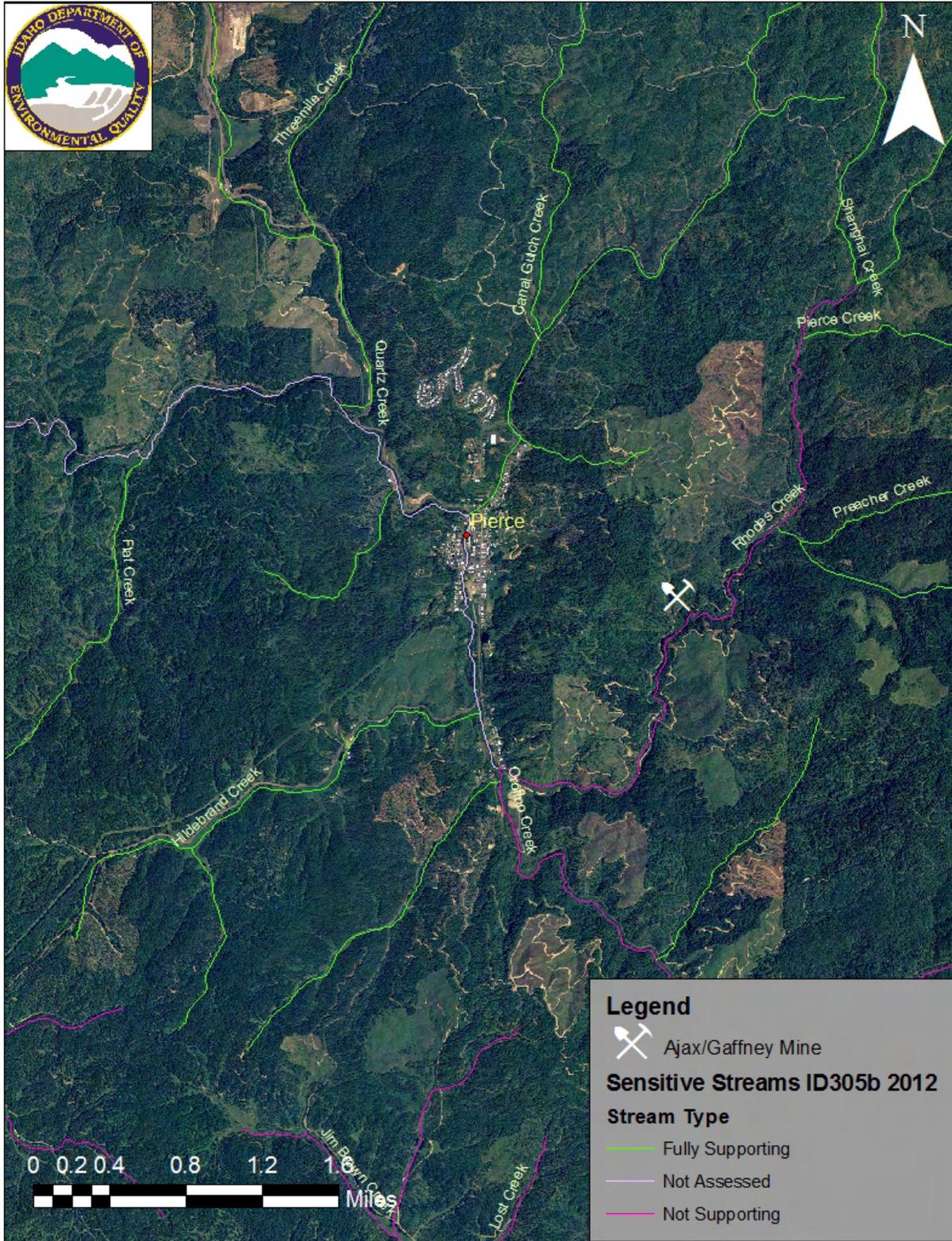


Figure 7. Sensitive Streams Located by the Ozark Group of Claims
 (Map Source: IDEQ.GIS.ArcSDE 9.3 Geodatabase, NAIP 2004)

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Section 11. Summary and Conclusions

Generally speaking toxicological risks to human and ecological receptors are unlikely at the Ajax/Gaffney Mine and Mill sites. This is due to the lack of residences or structures, site workers, limited public access to the claims, and the sites represent very small percentages of the range for sensitive ecological receptors. There are several well vegetated ATV trails and the dump is very well vegetated. Thus airborne, water, and soil pathways presently do not exist.

The Ajax/Gaffney Mine ventilation raise is open and unrestricted. An old road/ATV trail runs directly next to it. This is a definite and dangerous safety hazard and needs to be closed or have access eliminated.

Elevated arsenic levels in the waste dump presently pose no immediate hazard. Although there are no permanent residents or site workers on or immediately adjacent to the site, some level of risk management planning could reduce or abate risks for these receptors as a result of future developments. As the photographs in Section 8 of this report reveal, the whole area is well vegetated and stabilized. DEQ will contact Mr. Gaffney and discuss the chemistry results and impress upon him that any visitors should minimize their exposure and contact at the dump site.

Based on existing conditions and uses, historic information, data observations made during the site visit, analysis of the mine wastes, potential pathways of contaminants to receptors, and potential exposures to ecological and human receptors, DEQ determines the Ozark Group of claims (Ajax/Gaffney Mine and Mill sites) as No Remedial Action is Planned (NRAP).

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Section 12. References

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Appendix A. Laboratory Sample Reports



CHAIN OF CUSTODY RECORD

SVL Analytical, Inc. • One Government Gulch • Kellogg, ID 83837 • (208) 784-1258 • FAX: (208) 783-0891

Page 1 of 7

FOR SVL USE ONLY
SVL JOB # W111012-6

Report to Company: DEQ
 Contact: BRUCE SCHULD
 Address: 1410 W HILTON
BOISE ID 83706
 Phone Number: 208 373 6554
 FAX Number: _____
 E-mail: bruce.schuld@deq.idaho.gov

Invoice Sent To: Bruce schuld
 Contact: _____
 Address: _____
 Phone Number: _____
 FAX Number: _____
 PO#: _____

TEMP on Receipt: 23.8°C

Table 1. — Matrix Type
 1 = Surface Water, 2 = Ground Water
 3 = Soil/Sediment, 4 = Rinsate, 5 = Oil
 6 = Waste, 7 = Other

Project Name: Alex
 Sampler's Signature: [Signature]

Indicate State of sample origination: DEQ USACE? Yes No

Sample ID	Collection Date	Time	Matrix Type (From Table 1)	Misc. No. of Containers	Preservative(s)				Other (Specify)	Analyses Required	Rush Instructions (Days)	Comments
					Unpreserved	HNO ₃ Filtered	HNO ₃ Unfiltered	HCl				
1 AISW1	6-29-11	11:45 AM	11							X	X	Hg for soil only Total on 1/20
2 AJWASS1	6-29-11	12:35	3	1		X				X	X	
3												
4												
5												
6												
7												
8												
9												
10												

Recinquired by: D STEWART
 Retinquired by: _____
 Date: 7-27-11 Time: 1 PM
 Received by: KIMMY MANA
 Date: 8/11/11 Time: 11:20 AM

* Sample Reject: Return Dispose Store (30 Days)

White: LAB COPY Yellow: CUSTOMER COPY

mailed to SVL lab

S → nota b

SVL-COC 9/05

SAMPLE RECEIPT/CHAIN-OF-CUSTODY CHECKLIST

The following items were checked for completeness, correctness, and compliance to project specifications using the Chain-of-Custody (COC) and other supporting information.

Date of acceptance: 8/4/11

By: CP Seery

SVL Work No: W140126

Item	Description	V	VC	NV	NA	Comments
1	Client or project name	✓				DEQ
2	Date and time of receipt at lab	✓				8/4/11 11:20am
3	Received by	✓				Kenny Mayer
4	Temperature blank or cooler temperature	✓				Temp. 23.8c.
5	Were the sample(s) received on ice	✓				Yes
6	Custody tape/bottle seals				✓	None
7	Condition of samples upon receipt (leaking; bubbles in VOA vials)	✓				Good
8	Sample numbers/IDs agree with COC	✓				
9	Sample date & time agree with COC	✓				
10	Number of containers for each sample	✓				
11	The correct preservative for the analysis requested	✓				
12	Did an SVL employee preserve sample(s) upon receipt	✓			✓	
12	Type of container for each sample / volume received	✓				
13	Analysis requested for each sample	✓				
14	Sample matrix description	✓				
15	COC properly completed & legible	✓				
16	Corrections properly made (initials & date)				✓	
17	Additional comments or records of sample condition or treatment (unlisted or missing samples at laboratory, aliquot taken, sample hold, samples subcontracted, communications between client and laboratory)				✓	
18	Shipper's air bill	✓				

V- Verified VC- Verified Corrections Made NV-Not Verified NA- Not Applicable

Additional Comments: _____



One Government Gulch - PO Box 929

Kellogg ID 83837-0929

(208) 784-1258

Fax (208) 783-0891

IDEQ (Boise) 1410 N. Hilton Boise, ID 83706	Project Name: Boise Work Order: WIH0126 Reported: 19-Aug-11 13:28
---	---

ANALYTICAL REPORT FOR SAMPLES

Sample ID	Laboratory ID	Matrix	Date Sampled	Sampled By	Date Received
AJSW1	WIH0126-01	Surface Water	29-Jul-11 11:00	DS	04-Aug-2011
AJWDSS1	WIH0126-02	Soil	29-Jul-11 12:00	BS	04-Aug-2011

Solid samples are analyzed on an as-received, wet-weight basis, unless otherwise requested.

Sample preparation is defined by the client as per their Data Quality Objectives.

This report supercedes any previous reports for this Work Order. The complete report includes pages for each sample, a full QC report, and a notes section.

The results presented in this report relate only to the samples, and meet all requirements of the NELAC Standards unless otherwise noted.

(Q6) SVL received the following containers outside of published EPA guidelines for preservation temperatures (0-6°C).

The guidelines do not pertain to nitric-preserved metals.

Default Cooler (Received Temperature: 23.8°C)

Labnumber	Container	Client ID	Labnumber	Container	Client ID
WIH0126-01 A	Nitric HDPE	AJSW1	WIH0126-02 A	Bag, cloth	AJWDSS1



One Government Gulch - PO Box 929

Kellogg ID 83837-0929

(208) 784-1258

Fax (208) 783-0891

IDEQ (Boise) 1410 N. Hilton Boise, ID 83706	Project Name: Boise Work Order: W1H0126 Reported: 19-Aug-11 13:28
---	---

Client Sample ID: **AJSW1**

SVL Sample ID: **W1H0126-01 (Surface Water)**

Sample Report Page 1 of 1

Sampled: 29-Jul-11 11:00

Received: 04-Aug-11

Sampled By: DS

Method	Analyte	Result	Units	RL	MDL	Dilution	Batch	Analyst	Analyzed	Notes
Metals (Total Recoverable)										
EPA 6010B	Antimony	< 0.020	mg/L	0.020	0.005		W133002	TJK	08/12/11 14:15	
EPA 6010B	Arsenic	< 0.025	mg/L	0.025	0.007		W133002	TJK	08/12/11 14:15	
EPA 6010B	Barium	0.0761	mg/L	0.0020	0.0004		W133002	TJK	08/12/11 14:15	
EPA 6010B	Cadmium	< 0.0020	mg/L	0.0020	0.0005		W133002	TJK	08/12/11 14:15	
EPA 6010B	Chromium	< 0.0060	mg/L	0.0060	0.0006		W133002	TJK	08/12/11 14:15	
EPA 6010B	Copper	< 0.010	mg/L	0.010	0.003		W133002	TJK	08/12/11 14:15	
EPA 6010B	Iron	0.221	mg/L	0.060	0.017		W133002	TJK	08/12/11 14:14	
EPA 6010B	Lead	< 0.0075	mg/L	0.0075	0.0034		W133002	TJK	08/12/11 14:15	
EPA 6010B	Manganese	0.0110	mg/L	0.0040	0.0011		W133002	TJK	08/12/11 14:14	
EPA 6010B	Selenium	< 0.040	mg/L	0.040	0.009		W133002	TJK	08/12/11 14:15	
EPA 6010B	Silver	< 0.0050	mg/L	0.0050	0.0005		W133002	TJK	08/12/11 14:15	
EPA 6010B	Zinc	< 0.0100	mg/L	0.0100	0.0021		W133002	TJK	08/12/11 14:15	

This data has been reviewed for accuracy and has been authorized for release by the Laboratory Director or designee.

John Kern
Laboratory Director



One Government Gulch - PO Box 929

Kellogg ID 83837-0929

(208) 784-1258

Fax (208) 783-0891

IDEQ (Boise) 1410 N. Hilton Boise, ID 83706	Project Name: Boise Work Order: W1H0126 Reported: 19-Aug-11 13:28
---	---

Client Sample ID: **AJWDSS1**

SVL Sample ID: **W1H0126-02 (Soil)**

Sample Report Page 1 of 1

Sampled: 29-Jul-11 12:00

Received: 04-Aug-11

Sampled By: BS

Method	Analyte	Result	Units	RL	MDL	Dilution	Batch	Analyst	Analyzed	Notes
Metals (Total) by EPA 6000/7000 Methods										
EPA 6010B	Antimony	< 2.0	mg/kg	2.0	0.4		W133071	DT	08/18/11 16:43	
EPA 6010B	Arsenic	508	mg/kg	2.5	0.4		W133071	DT	08/18/11 16:43	
EPA 6010B	Barium	416	mg/kg	0.200	0.024		W133071	DT	08/18/11 16:43	
EPA 6010B	Cadmium	1.35	mg/kg	0.20	0.02		W133071	DT	08/18/11 16:43	
EPA 6010B	Chromium	41.9	mg/kg	0.60	0.05		W133071	DT	08/18/11 16:43	
EPA 6010B	Copper	123	mg/kg	1.00	0.21		W133071	DT	08/18/11 16:43	
EPA 6010B	Iron	40800	mg/kg	6.0	1.1		W133071	DT	08/18/11 16:42	
EPA 6010B	Lead	12.4	mg/kg	0.75	0.21		W133071	DT	08/18/11 16:43	
EPA 6010B	Manganese	637	mg/kg	0.40	0.04		W133071	DT	08/18/11 16:42	
EPA 6010B	Selenium	5.4	mg/kg	4.0	1.2		W133071	DT	08/18/11 16:43	
EPA 6010B	Silver	1.16	mg/kg	0.50	0.04		W133071	DT	08/18/11 16:43	
EPA 6010B	Zinc	82.3	mg/kg	1.00	0.09		W133071	DT	08/18/11 16:43	
EPA 7471A	Mercury	0.338	mg/kg	0.033	0.007		W134030	JAA	08/16/11 13:56	
Percent Solids										
Percent Solids	% Solids	86.5	%	0.1			W133073	DP	08/09/11 10:42	

This data has been reviewed for accuracy and has been authorized for release by the Laboratory Director or designee.

John Kern
Laboratory Director



IDEQ (Boise)
1410 N. Hilton
Boise, ID 83706

Project Name: Boise
Work Order: **W1H0126**
Reported: 19-Aug-11 13:28

Quality Control - BLANK Data

Method	Analyte	Units	Result	MDL	MRL	Batch ID	Analyzed	Notes
Metals (Total) by EPA 6000/7000 Methods								
EPA 6010B	Antimony	mg/kg	<2.0	0.4	2.0	W133071	18-Aug-11	
EPA 6010B	Arsenic	mg/kg	<2.5	0.4	2.5	W133071	18-Aug-11	
EPA 6010B	Barium	mg/kg	<0.200	0.024	0.200	W133071	18-Aug-11	
EPA 6010B	Cadmium	mg/kg	<0.20	0.02	0.20	W133071	18-Aug-11	
EPA 6010B	Chromium	mg/kg	<0.60	0.05	0.60	W133071	18-Aug-11	
EPA 6010B	Copper	mg/kg	<1.00	0.21	1.00	W133071	18-Aug-11	B7
EPA 6010B	Iron	mg/kg	<6.0	1.1	6.0	W133071	18-Aug-11	
EPA 6010B	Lead	mg/kg	<0.75	0.21	0.75	W133071	18-Aug-11	
EPA 6010B	Manganese	mg/kg	<0.40	0.04	0.40	W133071	18-Aug-11	
EPA 6010B	Selenium	mg/kg	<4.0	1.2	4.0	W133071	18-Aug-11	
EPA 6010B	Silver	mg/kg	<0.50	0.04	0.50	W133071	18-Aug-11	
EPA 6010B	Zinc	mg/kg	<1.00	0.09	1.00	W133071	18-Aug-11	
EPA 7471A	Mercury	mg/kg	<0.033	0.007	0.033	W134030	16-Aug-11	

Metals (Total Recoverable)

EPA 6010B	Antimony	mg/L	<0.020	0.005	0.020	W133002	12-Aug-11	
EPA 6010B	Arsenic	mg/L	<0.025	0.007	0.025	W133002	12-Aug-11	
EPA 6010B	Barium	mg/L	<0.0020	0.0004	0.0020	W133002	12-Aug-11	
EPA 6010B	Cadmium	mg/L	<0.0020	0.0005	0.0020	W133002	12-Aug-11	
EPA 6010B	Chromium	mg/L	<0.0060	0.0006	0.0060	W133002	12-Aug-11	
EPA 6010B	Copper	mg/L	<0.010	0.003	0.010	W133002	12-Aug-11	
EPA 6010B	Iron	mg/L	<0.060	0.017	0.060	W133002	12-Aug-11	
EPA 6010B	Lead	mg/L	<0.0075	0.0034	0.0075	W133002	12-Aug-11	
EPA 6010B	Manganese	mg/L	<0.0040	0.0011	0.0040	W133002	12-Aug-11	
EPA 6010B	Selenium	mg/L	<0.040	0.009	0.040	W133002	12-Aug-11	
EPA 6010B	Silver	mg/L	<0.0050	0.0005	0.0050	W133002	12-Aug-11	
EPA 6010B	Zinc	mg/L	<0.0100	0.0021	0.0100	W133002	12-Aug-11	

Quality Control - LABORATORY CONTROL SAMPLE Data

Method	Analyte	Units	LCS Result	LCS True	% Rec.	Acceptance Limits	Batch ID	Analyzed	Notes
Metals (Total) by EPA 6000/7000 Methods									
EPA 6010B	Antimony	mg/kg	98.6	100	98.6	80 - 120	W133071	18-Aug-11	
EPA 6010B	Arsenic	mg/kg	93.4	100	93.4	80 - 120	W133071	18-Aug-11	
EPA 6010B	Barium	mg/kg	98.0	100	98.0	80 - 120	W133071	18-Aug-11	
EPA 6010B	Cadmium	mg/kg	99.6	100	99.6	80 - 120	W133071	18-Aug-11	
EPA 6010B	Chromium	mg/kg	108	100	108	80 - 120	W133071	18-Aug-11	
EPA 6010B	Copper	mg/kg	101	100	101	80 - 120	W133071	18-Aug-11	
EPA 6010B	Iron	mg/kg	1020	1000	102	80 - 120	W133071	18-Aug-11	
EPA 6010B	Lead	mg/kg	97.4	100	97.4	80 - 120	W133071	18-Aug-11	
EPA 6010B	Manganese	mg/kg	105	100	105	80 - 120	W133071	18-Aug-11	
EPA 6010B	Selenium	mg/kg	83.8	100	83.8	80 - 120	W133071	18-Aug-11	
EPA 6010B	Silver	mg/kg	5.18	5.00	104	80 - 120	W133071	18-Aug-11	
EPA 6010B	Zinc	mg/kg	95.3	100	95.3	80 - 120	W133071	18-Aug-11	
EPA 7471A	Mercury	mg/kg	0.860	0.833	103	80 - 120	W134030	16-Aug-11	

Metals (Total Recoverable)

EPA 6010B	Antimony	mg/L	1.00	1.00	100	80 - 120	W133002	12-Aug-11	
EPA 6010B	Arsenic	mg/L	0.962	1.00	96.2	80 - 120	W133002	12-Aug-11	
EPA 6010B	Barium	mg/L	0.990	1.00	99.0	80 - 120	W133002	12-Aug-11	
EPA 6010B	Cadmium	mg/L	1.01	1.00	101	80 - 120	W133002	12-Aug-11	
EPA 6010B	Chromium	mg/L	1.00	1.00	100	80 - 120	W133002	12-Aug-11	
EPA 6010B	Copper	mg/L	1.02	1.00	102	80 - 120	W133002	12-Aug-11	

SVL holds the following certifications:

AZ:0538, CA:2080, FL(NELAC):E87993, ID:ID00019 & ID00965 (Microbiology), NV:ID000192007A, WA:1268



IDEQ (Boise) 1410 N. Hilton Boise, ID 83706	Project Name: Boise Work Order: W1H0126 Reported: 19-Aug-11 13:28
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Quality Control - LABORATORY CONTROL SAMPLE Data (Continued)

Method	Analyte	Units	LCS Result	LCS True	% Rec.	Acceptance Limits	Batch ID	Analyzed	Notes
Metals (Total Recoverable) (Continued)									
EPA 6010B	Iron	mg/L	9.47	10.0	94.7	80 - 120	W133002	12-Aug-11	
EPA 6010B	Lead	mg/L	0.997	1.00	99.7	80 - 120	W133002	12-Aug-11	
EPA 6010B	Manganese	mg/L	0.980	1.00	98.0	80 - 120	W133002	12-Aug-11	
EPA 6010B	Selenium	mg/L	0.968	1.00	96.8	80 - 120	W133002	12-Aug-11	
EPA 6010B	Silver	mg/L	0.0519	0.0500	104	80 - 120	W133002	12-Aug-11	
EPA 6010B	Zinc	mg/L	0.985	1.00	98.5	80 - 120	W133002	12-Aug-11	

Quality Control - MATRIX SPIKE Data

Method	Analyte	Units	Spike Result	Sample Result (R)	Spike Level (S)	% Rec.	Acceptance Limits	Batch ID	Analyzed	Notes
Metals (Total) by EPA 6000/7000 Methods										
EPA 6010B	Antimony	mg/kg	50.0	<2.0	100	48.8	75 - 125	W133071	18-Aug-11	M2
EPA 6010B	Arsenic	mg/kg	443	508	100	R > 4S	75 - 125	W133071	18-Aug-11	M3
EPA 6010B	Barium	mg/kg	551	416	100	R > 4S	75 - 125	W133071	18-Aug-11	M3
EPA 6010B	Cadmium	mg/kg	99.8	1.35	100	98.5	75 - 125	W133071	18-Aug-11	
EPA 6010B	Chromium	mg/kg	159	41.9	100	117	75 - 125	W133071	18-Aug-11	
EPA 6010B	Copper	mg/kg	243	123	100	120	75 - 125	W133071	18-Aug-11	
EPA 6010B	Iron	mg/kg	43500	40800	1000	R > 4S	75 - 125	W133071	18-Aug-11	M3
EPA 6010B	Lead	mg/kg	110	12.4	100	97.2	75 - 125	W133071	18-Aug-11	
EPA 6010B	Manganese	mg/kg	859	637	100	R > 4S	75 - 125	W133071	18-Aug-11	M3
EPA 6010B	Selenium	mg/kg	88.5	5.4	100	83.1	75 - 125	W133071	18-Aug-11	
EPA 6010B	Silver	mg/kg	6.59	1.16	5.00	109	75 - 125	W133071	18-Aug-11	
EPA 6010B	Zinc	mg/kg	180	82.3	100	97.5	75 - 125	W133071	18-Aug-11	
EPA 7471A	Mercury	mg/kg	0.503	0.268	0.167	141	70 - 130	W134030	16-Aug-11	H3,M1

Metals (Total Recoverable)										
EPA 6010B	Antimony	mg/L	0.944	<0.020	1.00	94.4	75 - 125	W133002	12-Aug-11	
EPA 6010B	Arsenic	mg/L	0.940	<0.025	1.00	94.0	75 - 125	W133002	12-Aug-11	
EPA 6010B	Barium	mg/L	1.33	0.343	1.00	98.9	75 - 125	W133002	12-Aug-11	
EPA 6010B	Cadmium	mg/L	0.955	<0.0020	1.00	95.5	75 - 125	W133002	12-Aug-11	
EPA 6010B	Chromium	mg/L	0.961	<0.0060	1.00	95.8	75 - 125	W133002	12-Aug-11	
EPA 6010B	Copper	mg/L	1.06	0.013	1.00	104	75 - 125	W133002	12-Aug-11	
EPA 6010B	Iron	mg/L	22.3	12.3	10.0	99.3	75 - 125	W133002	12-Aug-11	
EPA 6010B	Lead	mg/L	0.994	<0.0075	1.00	98.9	75 - 125	W133002	12-Aug-11	
EPA 6010B	Manganese	mg/L	1.17	0.227	1.00	94.5	75 - 125	W133002	12-Aug-11	
EPA 6010B	Selenium	mg/L	0.994	<0.040	1.00	96.6	75 - 125	W133002	12-Aug-11	
EPA 6010B	Silver	mg/L	0.0515	<0.0050	0.0500	102	75 - 125	W133002	12-Aug-11	
EPA 6010B	Zinc	mg/L	0.930	0.0240	1.00	90.6	75 - 125	W133002	12-Aug-11	

Quality Control - MATRIX SPIKE DUPLICATE Data

Method	Analyte	Units	MSD Result	Spike Result	Spike Level	RPD	RPD Limit	Batch ID	Analyzed	Notes
Metals (Total) by EPA 6000/7000 Methods										
EPA 6010B	Antimony	mg/kg	49.4	50.0	100	1.2	20	W133071	18-Aug-11	
EPA 6010B	Arsenic	mg/kg	437	443	100	1.3	20	W133071	18-Aug-11	
EPA 6010B	Barium	mg/kg	512	551	100	7.2	20	W133071	18-Aug-11	
EPA 6010B	Cadmium	mg/kg	101	99.8	100	1.6	20	W133071	18-Aug-11	
EPA 6010B	Chromium	mg/kg	160	159	100	0.7	20	W133071	18-Aug-11	
EPA 6010B	Copper	mg/kg	223	243	100	8.5	20	W133071	18-Aug-11	
EPA 6010B	Iron	mg/kg	43100	43500	1000	0.8	20	W133071	18-Aug-11	
EPA 6010B	Lead	mg/kg	110	110	100	0.4	20	W133071	18-Aug-11	
EPA 6010B	Manganese	mg/kg	716	859	100	18.2	20	W133071	18-Aug-11	



IDEQ (Boise) 1410 N. Hilton Boise, ID 83706	Project Name: Boise Work Order: WIH0126 Reported: 19-Aug-11 13:28
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Quality Control - MATRIX SPIKE DUPLICATE Data (Continued)

Method	Analyte	Units	MSD Result	Spike Result	Spike Level	RPD	RPD Limit	Batch ID	Analyzed	Notes
Metals (Total) by EPA 6000/7000 Methods (Continued)										
EPA 6010B	Selenium	mg/kg	92.0	88.5	100	3.9	20	W133071	18-Aug-11	
EPA 6010B	Silver	mg/kg	6.56	6.59	5.00	0.4	20	W133071	18-Aug-11	
EPA 6010B	Zinc	mg/kg	182	180	100	1.0	20	W133071	18-Aug-11	
EPA 7471A	Mercury	mg/kg	0.483	0.503	0.167	4.1	20	W134030	16-Aug-11	H3
Metals (Total Recoverable)										
EPA 6010B	Antimony	mg/L	0.951	0.944	1.00	0.7	20	W133002	12-Aug-11	
EPA 6010B	Arsenic	mg/L	0.953	0.940	1.00	1.3	20	W133002	12-Aug-11	
EPA 6010B	Barium	mg/L	1.34	1.33	1.00	0.6	20	W133002	12-Aug-11	
EPA 6010B	Cadmium	mg/L	0.965	0.955	1.00	1.0	20	W133002	12-Aug-11	
EPA 6010B	Chromium	mg/L	0.969	0.961	1.00	0.8	20	W133002	12-Aug-11	
EPA 6010B	Copper	mg/L	1.07	1.06	1.00	0.9	20	W133002	12-Aug-11	
EPA 6010B	Iron	mg/L	22.3	22.3	10.0	0.0	20	W133002	12-Aug-11	
EPA 6010B	Lead	mg/L	1.00	0.994	1.00	1.1	20	W133002	12-Aug-11	
EPA 6010B	Manganese	mg/L	1.18	1.17	1.00	0.5	20	W133002	12-Aug-11	
EPA 6010B	Selenium	mg/L	1.02	0.994	1.00	2.3	20	W133002	12-Aug-11	
EPA 6010B	Silver	mg/L	0.0520	0.0515	0.0500	1.0	20	W133002	12-Aug-11	
EPA 6010B	Zinc	mg/L	0.937	0.930	1.00	0.8	20	W133002	12-Aug-11	

Quality Control - POST DIGESTION SPIKE Data

Method	Analyte	Units	Spike Result	Sample Result (R)	Spike Level (S)	% Rec.	Acceptance Limits	Batch ID	Analyzed	Notes
Metals (Total) by EPA 6000/7000 Methods										
EPA 6010B	Antimony	mg/kg	85.0	<2.0	100	83.8	75 - 125	W133071	19-Aug-11	

Notes and Definitions

- B7 Target analyte in method blank exceeded method QC limits, but concentrations in samples were at least 10x the blank concentration.
- H3 Sample was received and analyzed past holding time.
- M1 Matrix spike recovery was high, but the LCS recovery was acceptable.
- M2 Matrix spike recovery was low, but the LCS recovery was acceptable.
- M3 The spike recovery value is unusable since the analyte concentration in the sample is disproportionate to spike level. The LCS was acceptable.
- LCS Laboratory Control Sample (Blank Spike)
- RPD Relative Percent Difference
- UDL A result is less than the detection limit
- R > 4S % recovery not applicable, sample concentration more than four times greater than spike level
- <RL A result is less than the reporting limit
- MRL Method Reporting Limit
- MDL Method Detection Limit
- N/A Not Applicable